



P.B. 5818 - Patentlaan 2  
2280 HV Rijswijk (ZH)  
☎ +31 70 340 2040  
TX 31651 epo nl  
FAX +31 70 340 3016

Europäisches  
Patentamt

Zweigstelle  
in Den Haag  
Recherchen-  
abteilung

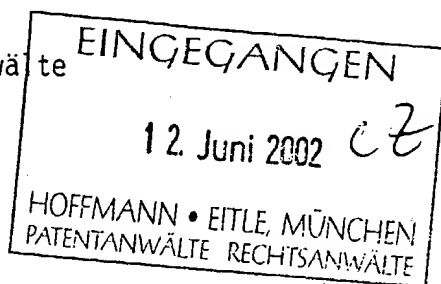
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HOFFMANN - EITLE  
Patent- und Rechtsanwälte  
Arabellastrasse 4  
81925 München  
ALLEMAGNE



12/10  
Sen

Datum/Date

12. 06. 02

Zeichen/Ref./Réf.

88 474 a/scho

Anmeldung Nr./Application No./Demande n°/Patent Nr./Patent No./Brevet n°.

01115672.6

Anmelder/Applicant/Demandeur/Patentinhaber/Proprietor/Titulaire

MITSUI CHEMICALS, INC.

## COMMUNICATION

The European Patent Office herewith transmits

- ☒ the European search report
- ☐ the declaration under Rule 45 EPC
- ☐ the partial European search report under Rule 45 EPC
- ☐ the supplementary European search report concerning the international application under Article 157(2) EPC relating to the above-mentioned European patent application. Copies of the documents cited in the search report are enclosed.

The following specifications given by the applicant have been approved by the Search Division :

- ☒ Abstract ☐ Title ☐ Figure
- ☐ The abstract was modified by the Search Division and the definitive text is attached to this communication.
- ☐ The following figure will be published with the abstract, since the Search Division considers that it better characterises the invention than the one indicated by the applicant.

Figure:

- ☒ Additional copy(copies) of the documents cited in the European search report.

## REFUND OF THE SEARCH FEE

If applicable under Article 10 Rules relating to fees, a separate communication from the Receiving Section on the refund of the search fee will be sent later.





### CLAIMS INCURRING FEES

The present European patent application comprised at the time of filing more than ten claims.

- ☐ Only part of the claims have been paid within the prescribed time limit. The present European search report has been drawn up for the first ten claims and for those claims for which claims fees have been paid, namely claim(s):
- ☐ No claims fees have been paid within the prescribed time limit. The present European search report has been drawn up for the first ten claims.

### LACK OF UNITY OF INVENTION

The Search Division considers that the present European patent application does not comply with the requirements of unity of invention and relates to several inventions or groups of inventions, namely:

see sheet B

- ☐ All further search fees have been paid within the fixed time limit. The present European search report has been drawn up for all claims.
- ☐ As all searchable claims could be searched without effort justifying an additional fee, the Search Division did not invite payment of any additional fee.
- ☒ Only part of the further search fees have been paid within the fixed time limit. The present European search report has been drawn up for those parts of the European patent application which relate to the inventions in respect of which search fees have been paid, namely claims:  
1-3, 4 (partially)-14 (partially)
- ☐ None of the further search fees have been paid within the fixed time limit. The present European search report has been drawn up for those parts of the European patent application which relate to the invention first mentioned in the claims, namely claims:



DOCUMENTS CONSIDERED TO BE RELEVANT			
Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	CLASSIFICATION OF THE APPLICATION (Int.Cl.7)
X	EP 0 990 664 A (MITSUI CHEMICALS INC) 5 April 2000 (2000-04-05) * page 118, line 56 - page 119, line 36 * * examples 11,22,24,25 * * page 8, line 10 - line 31 * * page 11, line 1 - line 15 * * page 12, line 21 - line 40 * * claims 1-3,9 * ---	1-4,9,14	C08F210/02 C08F210/16 C08F4/622 C08F4/54
X	EP 0 889 061 A (UNION CARBIDE CHEM PLASTIC) 7 January 1999 (1999-01-07) * page 2 - page 3 * * page 6, line 54 - page 7, line 7 * * examples 1-5 * * claims 1-8 * ---	1-3,14	
D,X	MECKING ET AL: "Mechanistic Studies of the Palladium-Catalyzed Copolymerization of Ethylene and alpha-Olefins with Methyl Acrylate" JOURNAL OF THE AMERICAN CHEMICAL SOCIETY, AMERICAN CHEMICAL SOCIETY, WASHINGTON, DC, US, vol. 120, 27 January 1998 (1998-01-27), pages 888-899, XP002151753 ISSN: 0002-7863 * page 892; table 2 * * page 894, column 1, last paragraph * ---	1,14	TECHNICAL FIELDS SEARCHED (Int.Cl.7)  C08F
X	WO 99 19335 A (GIBSON VERNON CHARLES ;NEWTON CLAIRE (GB); BP CHEM INT LTD (GB); S) 22 April 1999 (1999-04-22) * page 30; example 6.3 * * page 11 - page 12; examples B1,B2 * * page 12; examples B3,B4 * * page 13; example B5 * * page 15, line 22 - line 26 * * page 37, runs 5,6, table 2 * --- -/--	4,5,9, 10,14	
The present search report has been drawn up for all claims			
Place of search <b>THE HAGUE</b>		Date of completion of the search <b>29 May 2002</b>	Examiner <b>Gamb, V</b>
<b>CATEGORY OF CITED DOCUMENTS</b> X : particularly relevant if taken alone Y : particularly relevant if combined with another document of the same category A : technological background O : non-written disclosure P : intermediate document  T : theory or principle underlying the invention E : earlier patent document, but published on, or after the filing date D : document cited in the application L : document cited for other reasons - : member of the same patent family, corresponding document			



DOCUMENTS CONSIDERED TO BE RELEVANT																			
Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	CLASSIFICATION OF THE APPLICATION (Int.Cl.7)																
X	EP 1 008 595 A (MITSUI CHEMICALS INC) 14 June 2000 (2000-06-14) * page 4, line 10 - line 38 * * page 15 - page 16 * * page 18 * * page 36, line 22 - line 52 * * page 57 - page 58; examples 1,8 * * claims 1-4 *	5,10,14																	
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X	PATENT ABSTRACTS OF JAPAN vol. 1999, no. 12, 29 October 1999 (1999-10-29) & JP 11 199592 A (MITSUI CHEM INC), 27 July 1999 (1999-07-27) * abstract * * page 12 * * page 15 * * page 17 * * page 26 * * page 28 * * page 36 *	6-8, 11-14																	
L	WO 02 02649 A (SAITO JUNJI ;FUJITA TERUNORI (JP); INOUE YOSHIHISA (JP); MATSUGI T) 10 January 2002 (2002-01-10) * abstract * * page 18 *	6-8, 11-14																	
The present search report has been drawn up for all claims																			
Place of search THE HAGUE		Date of completion of the search 29 May 2002	Examiner Gamb, V																
<table border="0"><tr><td>CATEGORY OF CITED DOCUMENTS</td><td>T : theory or principle underlying the invention</td></tr><tr><td>X : particularly relevant if taken alone</td><td>E : earlier patent document, but published on, or</td></tr><tr><td>Y : particularly relevant if combined with another</td><td>after the filing date</td></tr><tr><td>document of the same category</td><td>D : document cited in the application</td></tr><tr><td>A : technological background</td><td>L : document cited for other reasons</td></tr><tr><td>O : non-written disclosure</td><td></td></tr><tr><td>P : intermediate document</td><td>&amp; : member of the same patent family, corresponding</td></tr><tr><td></td><td>document</td></tr></table>				CATEGORY OF CITED DOCUMENTS	T : theory or principle underlying the invention	X : particularly relevant if taken alone	E : earlier patent document, but published on, or	Y : particularly relevant if combined with another	after the filing date	document of the same category	D : document cited in the application	A : technological background	L : document cited for other reasons	O : non-written disclosure		P : intermediate document	& : member of the same patent family, corresponding		document
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document of the same category	D : document cited in the application																		
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O : non-written disclosure																			
P : intermediate document	& : member of the same patent family, corresponding																		
	document																		



The Search Division considers that the present European patent application does not comply with the requirements of unity of invention and relates to several inventions or groups of inventions, namely:

1. Claims: 1-3, 14 (partially)

Process for preparing a copolymer by copolymerising a non-polar olefin and a polar olefin in the presence of a catalyst represented by the formula  $LmMX_n$  wherein M is a metal selected from groups 3 to 11 and L is a ligand defined by the fact that the energy difference  $\Delta E = E_1 - E_2$  between the coordination energy  $E_1$  of the ligand L with ethylene and the coordination energy  $E_2$  of the ligand L with methyl acrylate is less or equal than 50 kJ/mol.

2. Claims: 4 (partially), 9 (partially), 14 (partially)

Process for preparing a copolymer by copolymerising a non-polar olefin and a polar olefin in the presence of a catalyst comprising the reaction product of a metallic compound represented by the formula (c) wherein M' is from group 4 with a ligand represented by formula (I).

3. Claims: 4 (partially), 9 (partially), 14 (partially)

Process for preparing a copolymer by copolymerising a non-polar olefin and a polar olefin in the presence of a catalyst comprising the reaction product of a metallic compound represented by the formula (c) wherein M' is from group 5 with a ligand represented by formula (I).

4. Claims: 4 (partially), 9 (partially), 14 (partially)

Process for preparing a copolymer by copolymerising a non-polar olefin and a polar olefin in the presence of a catalyst comprising the reaction product of a metallic compound represented by the formula (c) wherein M' is from group 6 with a ligand represented by formula (I).

5. Claims: 4 (partially), 9 (partially), 14 (partially)

Process for preparing a copolymer by copolymerising a non-polar olefin and a polar olefin in the presence of a catalyst comprising the reaction product of a metallic compound represented by the formula (c) wherein M' is from group 11 with a ligand represented by formula (I).

6. Claims: 5 (partially), 10 (partially), 14 (partially)

Process for preparing a copolymer by copolymerising a



The Search Division considers that the present European patent application does not comply with the requirements of unity of invention and relates to several inventions or groups of inventions, namely:

non-polar olefin and a polar olefin in the presence of a catalyst comprising the reaction product of a metallic compound represented by the formula (c) wherein M' is from group 4 with a ligand represented by formula (II).

7. Claims: 5 (partially), 10 (partially), 14 (partially)

Process for preparing a copolymer by copolymerising a non-polar olefin and a polar olefin in the presence of a catalyst comprising the reaction product of a metallic compound represented by the formula (c) wherein M' is from group 5 with a ligand represented by formula (II).

8. Claims: 5 (partially), 10 (partially), 14 (partially)

Process for preparing a copolymer by copolymerising a non-polar olefin and a polar olefin in the presence of a catalyst comprising the reaction product of a metallic compound represented by the formula (c) wherein M' is from group 6 with a ligand represented by formula (II).

9. Claims: 5 (partially), 10 (partially), 14 (partially)

Process for preparing a copolymer by copolymerising a non-polar olefin and a polar olefin in the presence of a catalyst comprising the reaction product of a metallic compound represented by the formula (c) wherein M' is from group 11 with a ligand represented by formula (II).

10. Claims: 6 (partially) - 8 (partially),  
11 (partially) - 14 (partially)

Process for preparing a copolymer by copolymerising a non-polar olefin and a polar olefin in the presence of a catalyst comprising the reaction product of a metallic compound represented by the formula (c') wherein M is from group 3 with a ligand represented by formula (III).

11. Claims: 6 (partially) - 8 (partially),  
11 (partially) - 14 (partially)

Process for preparing a copolymer by copolymerising a non-polar olefin and a polar olefin in the presence of a catalyst comprising the reaction product of a metallic



The Search Division considers that the present European patent application does not comply with the requirements of unity of invention and relates to several inventions or groups of inventions, namely:

compound represented by the formula (c') wherein M is from group 4 with a ligand represented by formula (III).

12. Claims: 6 (partially) - 8 (partially),  
11 (partially) - 14 (partially)

Process for preparing a copolymer by copolymerising a non-polar olefin and a polar olefin in the presence of a catalyst comprising the reaction product of a metallic compound represented by the formula (c') wherein M is from group 5 with a ligand represented by formula (III).

13. Claims: 6 (partially) - 8 (partially),  
11 (partially) - 14 (partially)

Process for preparing a copolymer by copolymerising a non-polar olefin and a polar olefin in the presence of a catalyst comprising the reaction product of a metallic compound represented by the formula (c') wherein M is from group 6 with a ligand represented by formula (III).

14. Claims: 6 (partially) - 8 (partially),  
11 (partially) - 14 (partially)

Process for preparing a copolymer by copolymerising a non-polar olefin and a polar olefin in the presence of a catalyst comprising the reaction product of a metallic compound represented by the formula (c') wherein M is from group 7 with a ligand represented by formula (III).

15. Claims: 6 (partially) - 8 (partially),  
11 (partially) - 14 (partially)

Process for preparing a copolymer by copolymerising a non-polar olefin and a polar olefin in the presence of a catalyst comprising the reaction product of a metallic compound represented by the formula (c') wherein M is from group 8 with a ligand represented by formula (III).

16. Claims: 6 (partially) - 8 (partially),  
11 (partially) - 14 (partially)



The Search Division considers that the present European patent application does not comply with the requirements of unity of invention and relates to several inventions or groups of inventions, namely:

Process for preparing a copolymer by copolymerising a non-polar olefin and a polar olefin in the presence of a catalyst comprising the reaction product of a metallic compound represented by the formula (c') wherein M is from group 9 with a ligand represented by formula (III).

17. Claims: 6 (partially) - 8 (partially),  
11 (partially) - 14 (partially)

Process for preparing a copolymer by copolymerising a non-polar olefin and a polar olefin in the presence of a catalyst comprising the reaction product of a metallic compound represented by the formula (c') wherein M is from group 10 with a ligand represented by formula (III).

18. Claims: 6 (partially) - 8 (partially),  
11 (partially) - 14 (partially)

Process for preparing a copolymer by copolymerising a non-polar olefin and a polar olefin in the presence of a catalyst comprising the reaction product of a metallic compound represented by the formula (c') wherein M is from group 11 with a ligand represented by formula (III).



ANNEX TO THE EUROPEAN SEARCH REPORT  
ON EUROPEAN PATENT APPLICATION NO.

EP 01 11 5672

This annex lists the patent family members relating to the patent documents cited in the above-mentioned European search report. The members are as contained in the European Patent Office EDP file on  
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29-05-2002

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